

# NASA TECH BRIEF



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## Development of Low Temperature Battery

### The problem:

To develop a low temperature battery capable of operating for at least 72 hours within a discharge temperature range of  $+20^{\circ}\text{C}$  to  $-90^{\circ}\text{C}$ .

### The solution:

A self-contained battery system consisting of a magnesium anode, potassium thiocyanate-ammonia electrolyte and a cathode composed of a mixture of sulfur, carbon, and mercuric sulfate ( $\text{Mg/KSCN:NH}_3/\text{HgSO}_4\text{:S:C}$ ).

### Notes:

1. Research and development on a ( $\text{Mg/KSCN:NH}_3/\text{HgSO}_4\text{:S:C}$ ) low temperature battery system has thus far produced a cell with a maximum life of 117 hours obtainable at  $-90^{\circ}\text{C}$ . The cell is capable of delivering 1.5 watts for 6 minutes and 0.3 watt for 54 minutes each hour. Continued research on this battery system should lead to further improvements in its performance.

2. Additional details are contained in the following reports:

- (a) NASA CR-54970, *First Quarterly Report—Low Temperature Battery*, by G. M. Armstrong, December 14, 1965 to March 13, 1966.
- (b) NASA CR-72173, *Second and Third Quarterly Reports (combined)—Low Temperature Battery*, by G. M. Armstrong, March 14, 1966 to September 13, 1966.

Copies of these reports are available from:

Technology Utilization Officer  
Lewis Research Center  
21000 Brookpark Road  
Cleveland, Ohio 44135  
Reference: B67-10546

### Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to NASA, Code GP, Washington, D.C. 20546.

Source: George M. Armstrong  
of Livingston Electronic Corporation  
under contract to  
Lewis Research Center  
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Category 01